CHAPTER 2

SITE CHARACTERISTICS

2.0 SITE CHARACTERISTICS

2.1 GEOGRAPHY AND DEMOGRAPHY

2.1.1 SITE LOCATION

The Independent Spent Fuel Storage Installation (ISFSI) is located on the H. B. Robinson (HBR) Plant site. The site location is described in Section 2.1.1.1 of the UFSAR.

2.1.2 SITE DESCRIPTION

A description of the site is provided in Section 2.1.1.2 of the UFSAR.

2.1.2.1 Other Activities Within the Site Boundary

Carolina Power & Light Company owns and operates a 2339 MWt nuclear generating plant (Unit 2) on the HBR Plant site. The ISFSI is located within the protected area for the nuclear unit. Unit 2 received an operating license from the U. S. Atomic Energy Commission in 1970 (Docket No. 50-261/License No. DPR-23).

Other activities within the site boundary are described in Section 2.1.1.2 of the UFSAR.

A spur track of a commercial railroad branches from a mainline at McBee, South Carolina, and passes 1600 ft. west of the plant. Extensions of this spur enter the immediate plant area and run both north and south of the ISFSI. The maximum speed for locomotives on the tracks near the ISFSI is 5 mph.

Various chemicals, gas bottles, and fire sources such as oil are stored onsite, but are not located in the immediate vicinity of the ISFSI and hence do not represent a hazard to the facility.

2.1.2.2 Boundaries for Establishing Effluent Release Limits

The exclusion zone is defined as the 1400 ft. radial area surrounding the plant. There are no residences or agricultural activities inside of the exclusion zone.

The controlled area for the ISFSI is defined as being contained within the HBR Unit 2 exclusion area. The protective area is within the Plant's exclusion zone. Exclusion area authority and control is discussed in Section 2.1.2 of the UFSAR.

2.1.3 POPULATION DISTRIBUTION AND TRENDS

2.1.3.1 Population Within 10 Miles

The estimated resident population between zero and ten miles of the Robinson site is presented in Section 2.1.3 of the UFSAR.

2.1.3.2 Population Between 10 and 50 Miles

The estimated resident population between ten and fifty miles is presented in Section 2.1.3 of the UFSAR.

2.1.3.3 Transient Population

The transient population within 10 miles of the HBR Plant site is composed of four major components: the industrial labor force, seasonal population variation, school population, and hospital/nursing home populations. These are discussed in Section 2.1.3 of the UFSAR.

2.1.4 USES OF NEARBY LAND AND WATERS

Uses of land and water are discussed in Sections 2.1 and 2.2 of the UFSAR.

2.2 NEARBY INDUSTRIAL, TRANSPORTATION, AND MILITARY FACILITIES

This information is provided in Section 2.2 of the UFSAR.

2.3 METEOROLOGY

Meteorological information, including regional climatology, local meteorology, onsite meteorological measurement programs, and diffusion estimates is provided in Section 2.3 of the UFSAR. The topography of the site is presented in Figure 2.1.1-2 of the UFSAR.

2.4 SURFACE HYDROLOGY

Surface hydrology information is presented in Section 2.4 of the UFSAR.

2.4.1 FLOODS

Flooding of the HBR site, on which the ISFSI is located, including information on the probable maximum flood and probable maximum precipitation at the site, is addressed in Section 2.4.4 of the UFSAR. Flooding at the ISFSI will not occur because the facility grade is above the maximum lake level which can be maintained by the dam and appurtenant structures. Two different peak flows were calculated using the design unit hydrograph for the drainage area above the Lake Robinson Dam. Using these two peak flows, the lake level would not exceed 222 ft. during high flow conditions. Grade elevation at the location of the ISFSI is approximately 235 ft.

2.4.2 POTENTIAL DAM FAILURES

The dams for both Lake Robinson and Prestwood Lake are downstream of the ISFSI; therefore, a dam failure would not flood the site, and since the ISFSI requires no water from the lakes for operation, a potential dam failure would not affect operation of the ISFSI.

2.4.3 PROBABLE MAXIMUM SURGE AND SEICHE FLOODING

The meteorology of the area is discussed in Section 2.3. Lake Robinson is a long, narrow lake and meteorological and astronomical events do not cause significant effects. The maximum expected lake level during high flow conditions is 222 ft. The ISFSI is approximately 1400 ft. away from the lake and the grade elevation is 235 ft. Therefore, surge and seiche flooding at the ISFSI will not occur.

2.4.4 PROBABLE MAXIMUM TSUNAMI FLOODING

The ISFSI is not adjacent to coastal areas; therefore, tsunami flooding is not a credible event.

2.4.5 ICE FLOODING

Due to the regional meteorological conditions (see Section 2.3) and the characteristics of the area water bodies (see Sections 2.4.1 and 2.4.2), ice flooding will not occur at the ISFSI.

2.4.6 FLOODING PROTECTION REQUIREMENTS

Flooding of the ISFSI is not a credible event; therefore, no flood protection requirements are necessary.

2.4.7 ENVIRONMENTAL ACCEPTANCE OF EFFLUENTS

The only liquid used for the ISFSI is during preparation of the spent fuel assemblies for loading into the GE IF-300 shipping canister is water. No liquids are used during the actual operation of the ISFSI.

Dispersion, dilution, and travel times of accidental releases of liquid effluents in surface water from the Robinson Plant, discussed in Section 2.4.6 of the UFSAR, will remain unaffected by the ISFSI.

2.5 SUBSURFACE HYDROLOGY

The Independent Spent Fuel Storage Installation provides for the storage of spent nuclear fuel in a dry condition. Therefore, there will be no consumption of groundwater or impact to the groundwater system as a result of installing the ISFSI at the Robinson site. Information on groundwater is presented in Section 2.4.7 of the UFSAR.

2.6 GEOLOGY AND SEISMOLOGY

Specific soil testing was performed at the designated location for the ISFSI. The data obtained from this testing was utilized in the foundation design for the ISFSI. As part of the foundation analysis/design, the subject of soil liquefaction was addressed. The following sections discuss the Robinson site geology and seismology. The foundation analysis is presented in Section 8.3 of this report. Geologic and seismic information for the site is presented in Section 2.5 of the UFSAR.

2.6.1 ISFSI Foundation

A specific soil testing and foundation evaluations was performed at the designated location for the ISFSI. The data obtained from this testing was utilized in the foundation design for the ISFSI. The subject of soil liquefaction has been addressed as follows:

The analysis of the subsurface profile at the site of the ISFSI confirms previous findings made from other subsurface investigations carried out on the HBR2 site. The analysis of the data obtained from the ISFSI site borings used the procedures recommended by Seed, Idriss, and Arango for estimating liquefaction susceptibility using standard penetration resistances (N-values).

Data collected from the borings indicates potential liquefaction; however, this sample represents the soil conditions at a depth of approximately 100 feet. This loose soil zone is less than 5 feet thick, is located beneath approximately 23 feet of the very hard silty clay of the Middendorf Formation and is surrounded by approximately 25 feet of firm to dense sand. Hard silty clay continues below the sand stratum at a depth of approximately 112 feet.

Based on a review of the previous explorations performed at the H. B. Robinson site, there is no indication of a similar zone of loose sand located at the depths encountered by this boring. The 5-foot zone of loose sand is believed to be an isolated pocket or lens not representative of an area-wide layer in the Middendorf Formation. Based on this analysis, the ISFSI site profile is considered to have a very low to no likelihood of liquefaction during a design basis earthquake.

Because liquefaction of the loose sand pocket at 100 feet cannot be completely discounted, the effects of liquefaction were examined. In the case of a confined layer of potentially liquefiable saturated sands at large depths, as in this boring for the ISFSI, the paramount problem is not one of bearing capacity or landslide susceptibility as in surficial sands, but one of surface settlement following complete liquefaction. It can be expected that the hard silty clay and dense sands surrounding the loose sand layer would bridge any effects from the liquefaction of the loose sands and no surface settlements would occur.

2.6.2 SLOPE STABILITY

The failure of any slopes at the Robinson site will not adversely effect the ISFSI. A discussion of slope stability of the earth dam and appurtenances at the Robinson site is provided in Section 2.5.5 of the UFSAR.

2.7 SUMMARY OF SITE CONDITIONS AFFECTING CONSTRUCTION AND OPERATING REQUIREMENTS

The HBR ISFSI is a totally passive installation designed by analysis to provide shielding and containment of irradiated fuel. The ISFSI is located within the protected area of the nuclear unit.

There are no residences or agricultural activities inside of the 1400 ft. radial area exclusion zone. The plant site has a temporate climate with the ISFSI facility grade above the maximum lake level which can be maintained by the dam and appurtenant structures.

The ISFSI will not affect any natural drainage features. A dam failure will also have no affect on the ISFSI as the dams for Lake Robinson and Lake Prestwood are downstream of the ISFSI.

On the basis of historical data, it is expected that the plant site area could experience a shock on the order of the 1959 McBee shock once during the life of the ISFSI facility. The design basis for the ISFSI is consistent with the HBR2 earthquake design basis of 0.2g horizontal acceleration.

A study of the possibility of the existence of faults in the area indicate that no active faulting was apparent. The sediments underlying the site are quite thick and apparently undisturbed. The surface of the buried crystallines is an ancient eroded one and active faulting is unknown in the vicinity of the site.

The failure of any slopes at the HBR site will not adversely affect the ISFSI.

REFERENCES: CHAPTER 2

None